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(54) Light emitting diode torch

(57) The torch uses a light emitting diode (LED) in place of a bulb and produces a light which may be red, green or yellow. The LED may be wired directly into the torch or fitted into a screw, bayonet or other bulb fitting in place of the bulb. The LED in such a fitting may also be used with a limiting resistor.

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IMPROVEMENTS IN TORCHES

This invention relates to an improved torch particularly, though not exclusively, for use by military personnel on night exercises.

In army exercises conducted by night, a low level of light is required for map reading, but the light needs to be red in colour in order to avoid attracting attention to the user of the torch. Conventional torches issued to servicemen are relatively bulky, and have an incandescent filament bulb. For night exercises, that bulb has to be viewed through a red filter, which means that the light and hence the power stored in the battery is used inefficiently. The weight of the heavy torch and batteries contributes to fatigue on a long march.

This invention relates to a torch fitted with an ultra-bright or high intensity light emitting diode.

The light emitting diode may emit green or yellow light, but red is preferred. Peak wavelengths are about 635 nm (red), 565 n. (green) and 583 nm(yellow). A high intensity LED has an intensity at I_{ftyp} of 25-30 mcd, whereas the corresponding intensity for an ultra-bright LED is 124-140 mcd. A low intensity LED emits about 4 mcd at I_{ftyp}.

The diode may be fitted into a small pocket torch of generally cylindrical form powered by two AA (HP 7) or AAA (HP 16) cells and may have a pen-type clip for fitting into a jacket pocket, rather than having to be carried in the

bergen or webbing. It is much light r and smaller than a conventional torch for this purpose.

The use of light emitting diodes brings a number of advantages. Owing to the low current consumption of the LEd. the batteries of the torch can last about 10-20 times as long as in a conventional torch with an incandescent filament bulb. Since there is no incandescent bulb. there is no filament to break. the torch is more robust and replacement bulbs do not have to be carried. The light produced is of the intensity required for night map reading and is more diffuse than the light from an incandescent bulb. Replacement batteries are also smaller.

Because of the low current drain. the torch is likely to remain usable if left on accidentally overnight. and will run on batteries that are considered flat for other purposes. It is believed that a penlight torch will run for about 2 days continuous use. whereas an normal army torch if fitted with an LED could last for about 16 days continuous use. . A conventional torch produces 3 volts from its batteries. The working voltage range of the LED is 2.2-5 volts. and it will continue to operate when the batteries are considered flat for an incandescent bulb. In an incandescent bulb. the illumination produced depends on the square of the current through the filament. so that once the battery voltage starts to drop. the bulb quickly dims. Current is also limited by the internal resistance of the battery. With an LED. current drain is minimal compared to

that of an incandescent lamp, battery resistance is less significant. and a good light output is obtained provided that the working voltage of the diode is available.

According to a further feature of the invention, the LED may be used as a direct replacement in a conventional torch having an incandescent bulb. For that purpose, the LED is fitted to a contact thimble having a screw or bayonet fitting e.g. an 11 mm MEAS L23 or 5 mm LES L25 screw fitting or an 11 mm MBC L24 bayonet fitting. It may be used in a service torch type bulb holder where there is a metal body having a lip around its top edge. It may also be a replacement for a vehicle panel indicator light bulb, though it may require to be used in association with a limiting resistor so that the LED is compatible with the 12-volt system of a vehicle. The LED may be used in a replacement for a bulb of the pre-focused type.

Although the initial use of the torch has been considered to be military, the torch could be used for night map reading in a car or lorry where its low red light would minimally distract the driver, and it could be used by hikers and mountaineers and for other recreational purposes.

CLAIMS

1. A torch fitted with an ultra-bright or high intensity light emitting diode.

2. A torch according to claim 1, wherein the LED emits light at about 635 nm.

3. A torch according to claim 1 or 2, wherein the Light emitting diode is a high intensity LED having an intensity at I_{Ftyp} of 25-30 mcd.

4. A torch according to claim 1 or 2, wherein the light emitting diode is an ultra-bright LED having an intensity at I_{Fmax} of 124-140 mcd.

5. A small pocket torch according to any of claims 1-4, which is of generally cylindrical form and is powered by two AA (HP 7) or AAA (HP 16) cells.

6. A small pocket torch according to claim 5 which has a pen-type clip for fitting into a pocket.

7. A torch according to any preceding claim, wherein the LED is fitted to a contact thimble having a screw or bayonet fitting.

8. A torch according to claim 7, wherein the contact thimble has an 11 mm MAS L23 or 5 mm LES L25 fitting.

9. The use of a torch as claimed in any of claims 108 for map reading.

10. A torch bulb contact thimble fitted with an LED in place of an incandescent bulb.

11. A torch fitted with a light emitting diode.

12. A torch according to claim 11, wher in the Light

emitting diode is has an intensity at Iptyp of at least 15 mcd.

13. A torch according to claim 11 or 12 which is a pocket torch.

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